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Palmer et al.

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(54) **AIRCRAFT MISSILE LAUNCHER COVER**

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(51) **Int. Cl.**

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F41F 7/00	(2006.01)
F41F 3/06	(2006.01)
H01Q 17/00	(2006.01)

(52) **U.S. Cl.**
CPC ***H01Q 15/14*** (2013.01); ***F41F 7/00*** (2013.01); ***F41F 3/0406*** (2013.01); ***F41F 3/06*** (2013.01); ***H01Q 17/00*** (2013.01)

(58) **Field of Classification Search**
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USPC 89/36.11, 1.819
See application file for complete search history.

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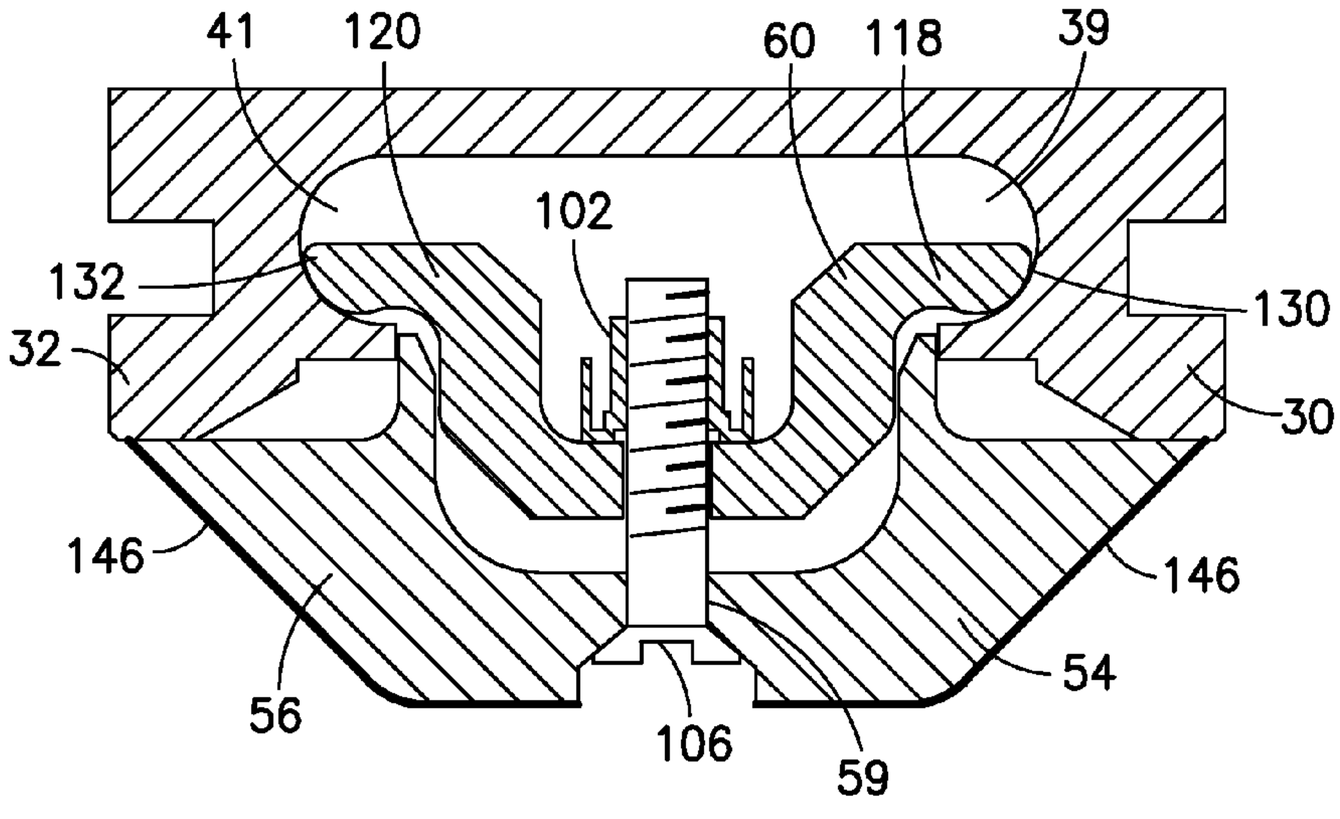
(57) **ABSTRACT**

A cover for an empty rail missile launcher that can be used in flight. The cover is shaped to reflect radar signals transmitted by a radar transmitter away from the radar transmitter to reduce detectibility by radar. The cover may also be coated with radar absorbent material to reduce detectibility by radar. Hangers are used to mount the cover to the rail missile launcher. The cover is provided with a grounding mechanism to dissipate precipitation static. A restraint mechanism is provided to prevent the cover from inadvertently sliding off the rail missile launcher.

18 Claims, 8 Drawing Sheets



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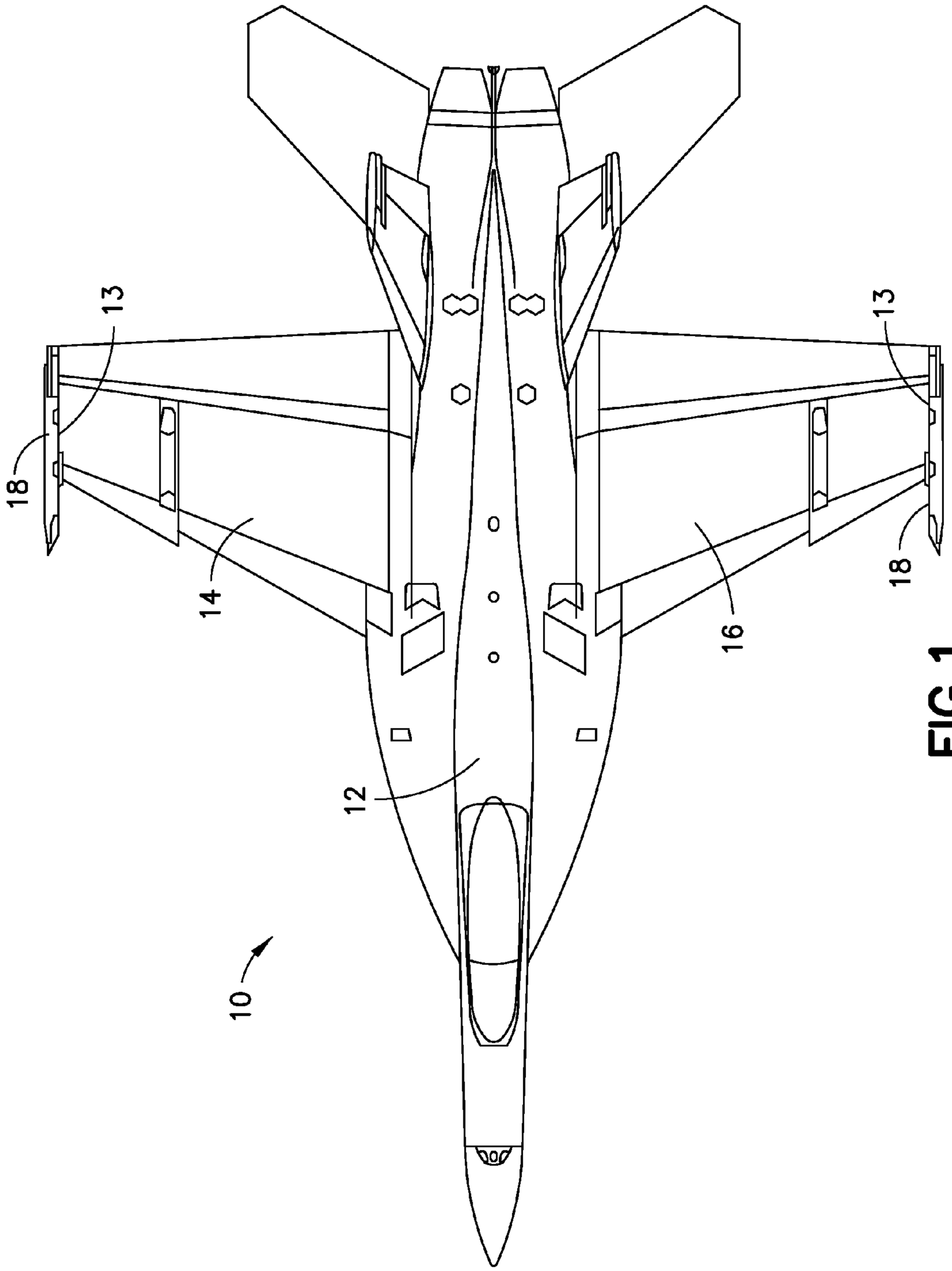


FIG. 1

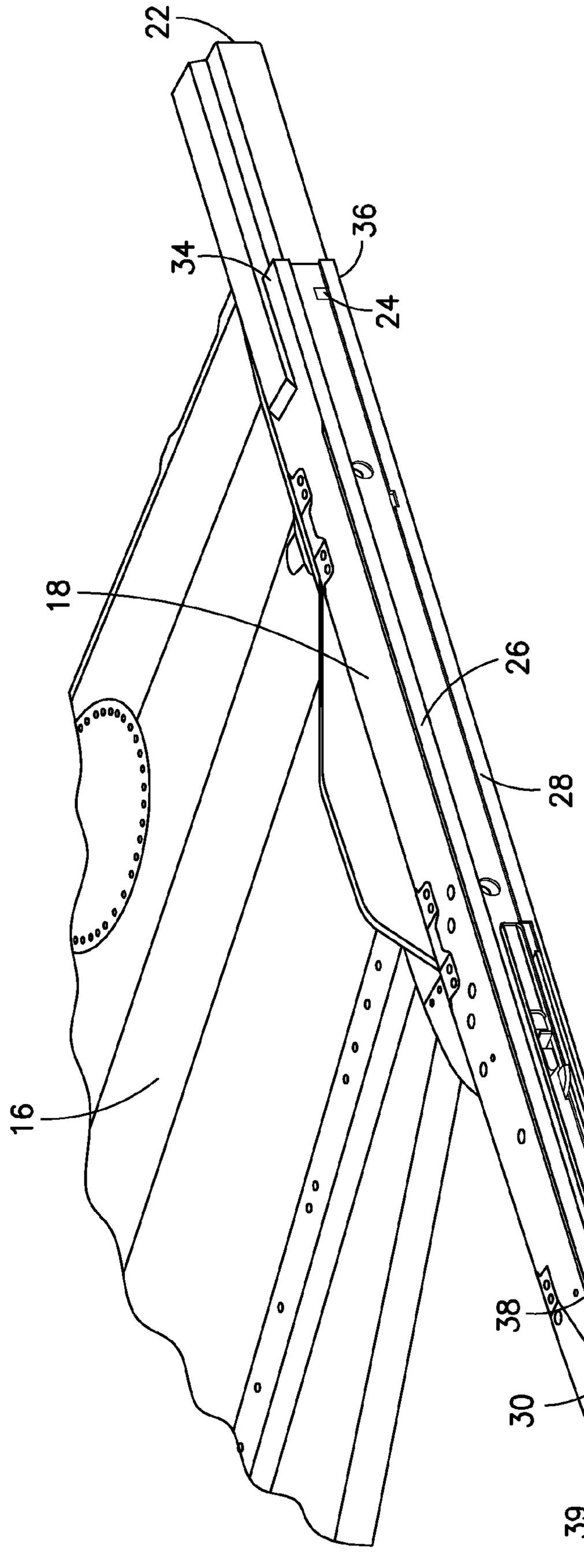
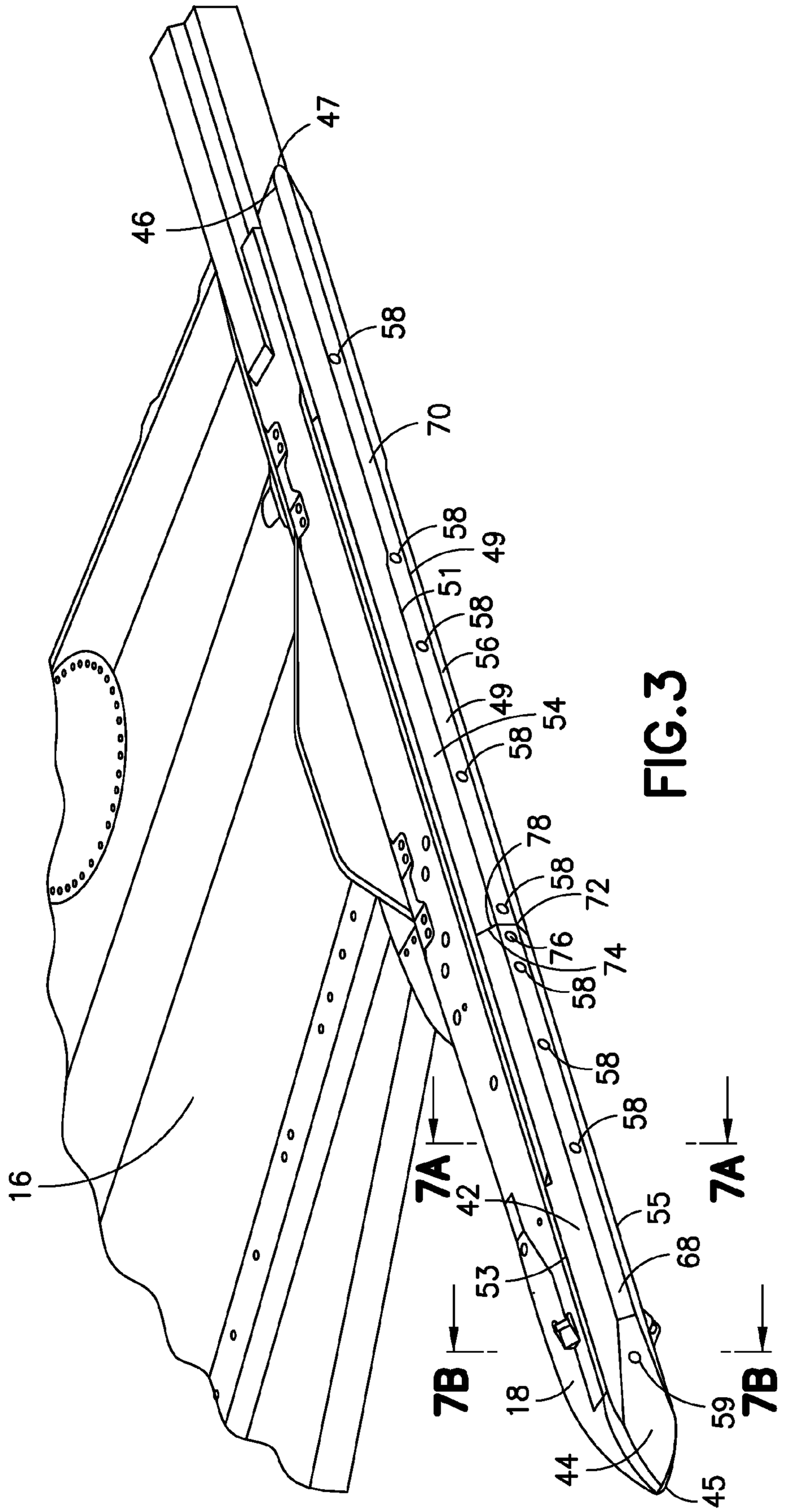


FIG.2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7A
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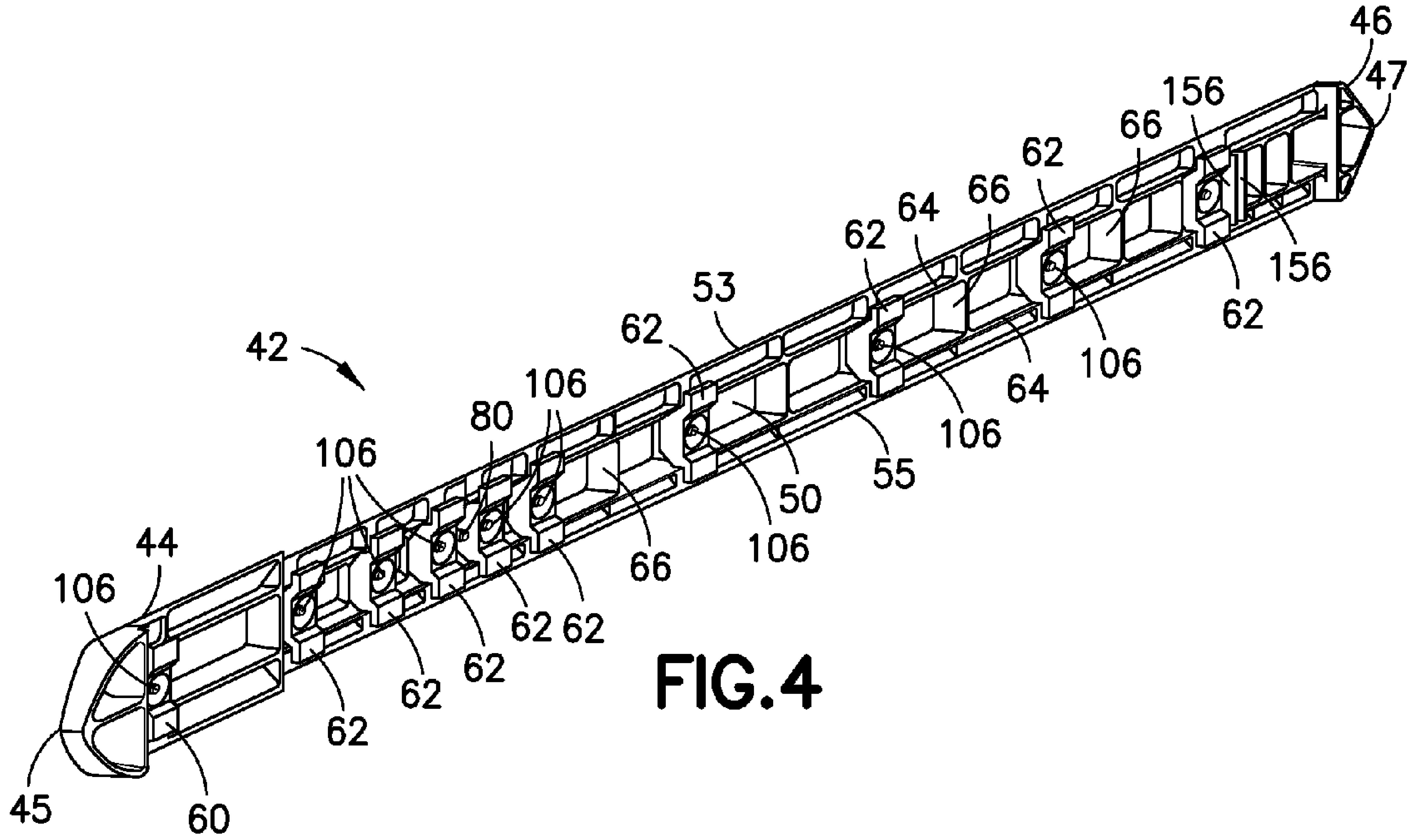
68
7B
7B
18
59
44
45

FIG.3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106
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FIG.4

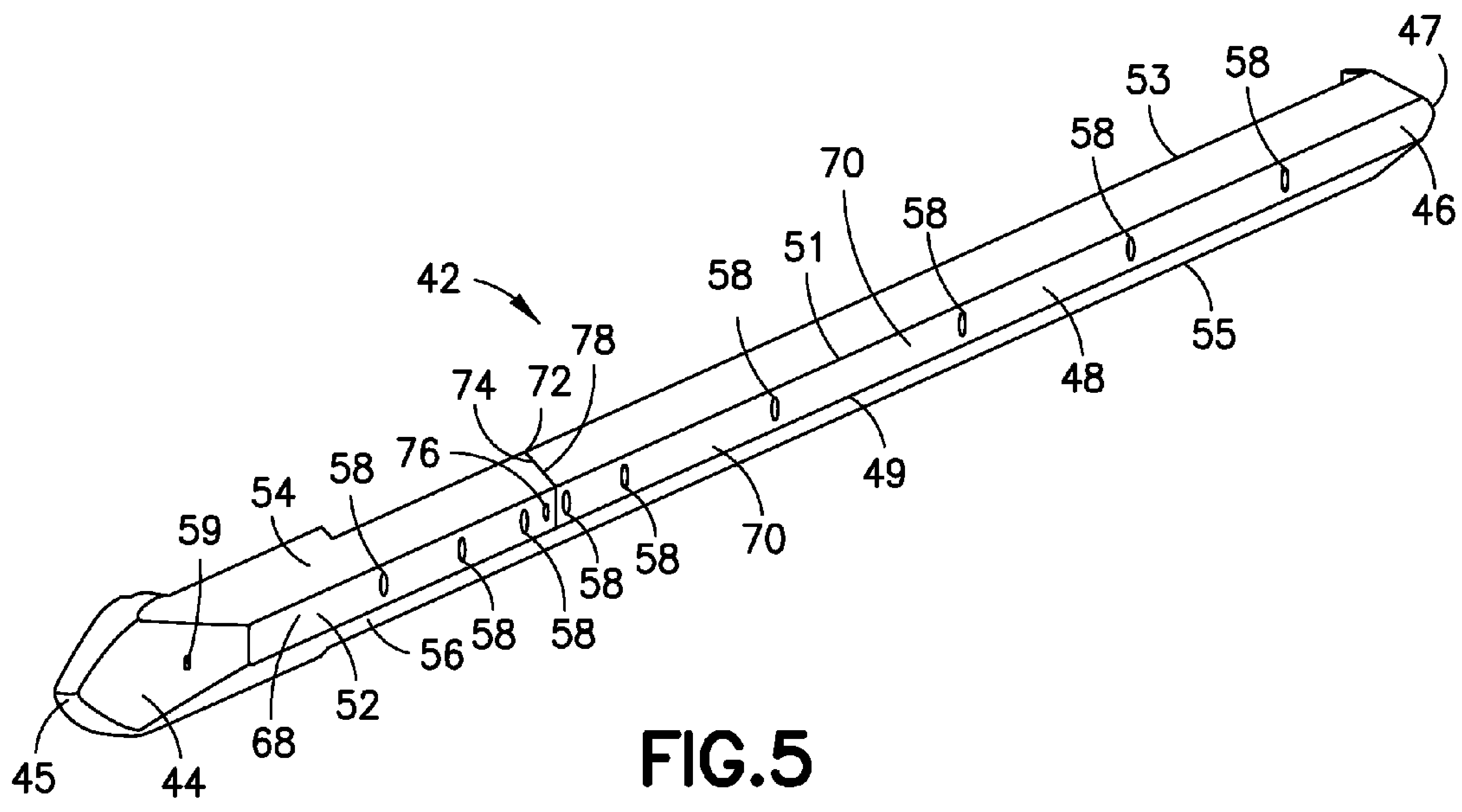
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FIG.5

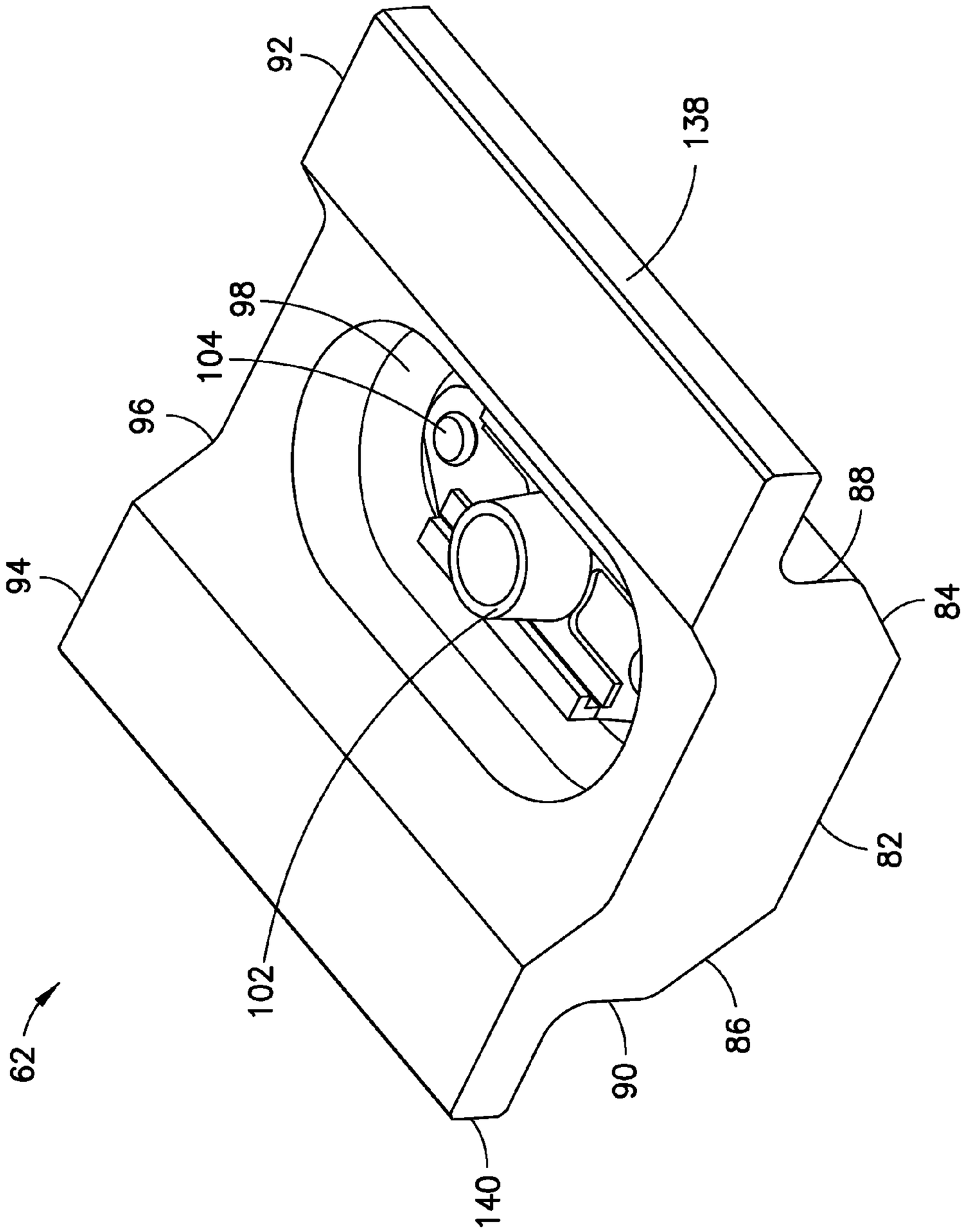
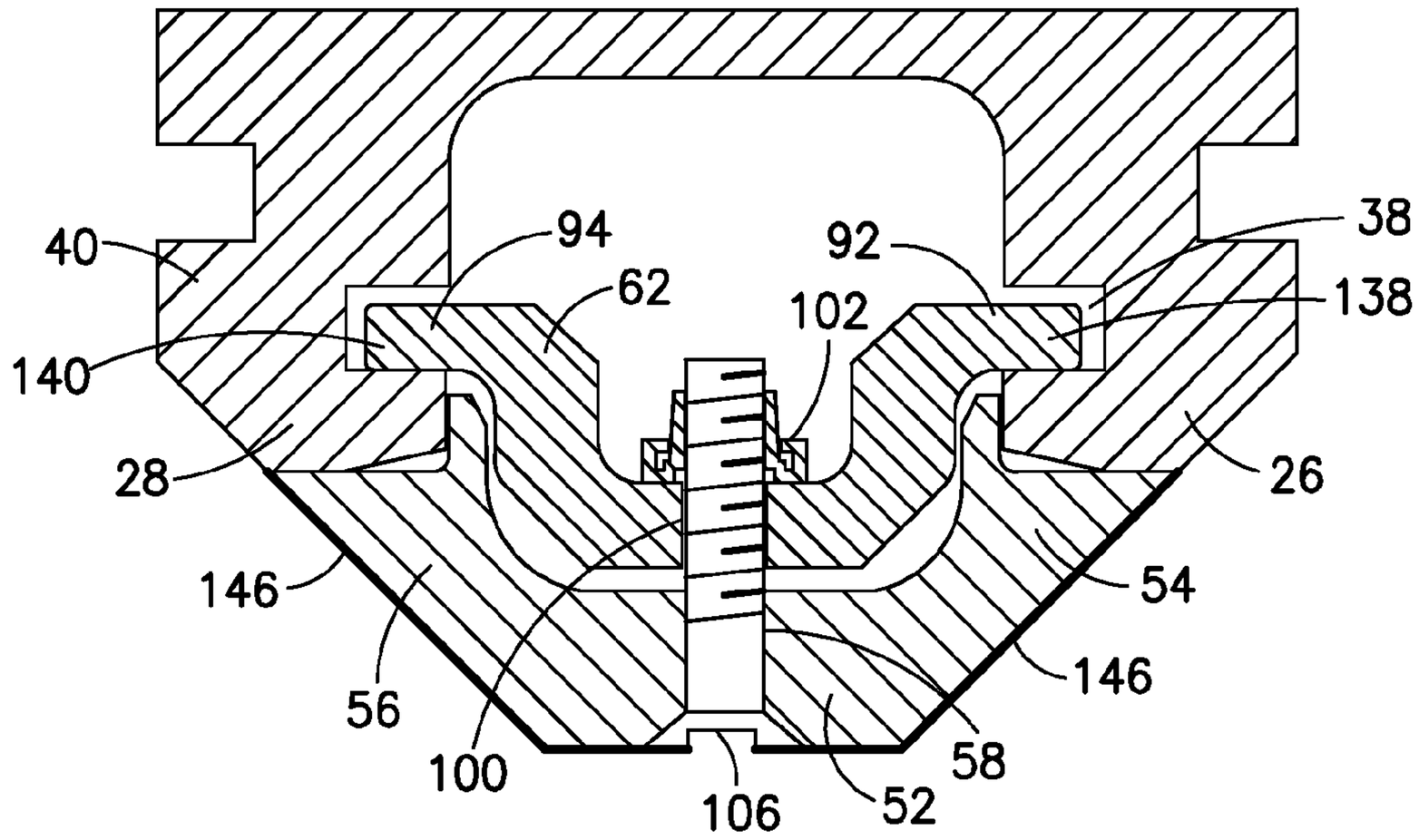


FIG.6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94
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146
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106
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58
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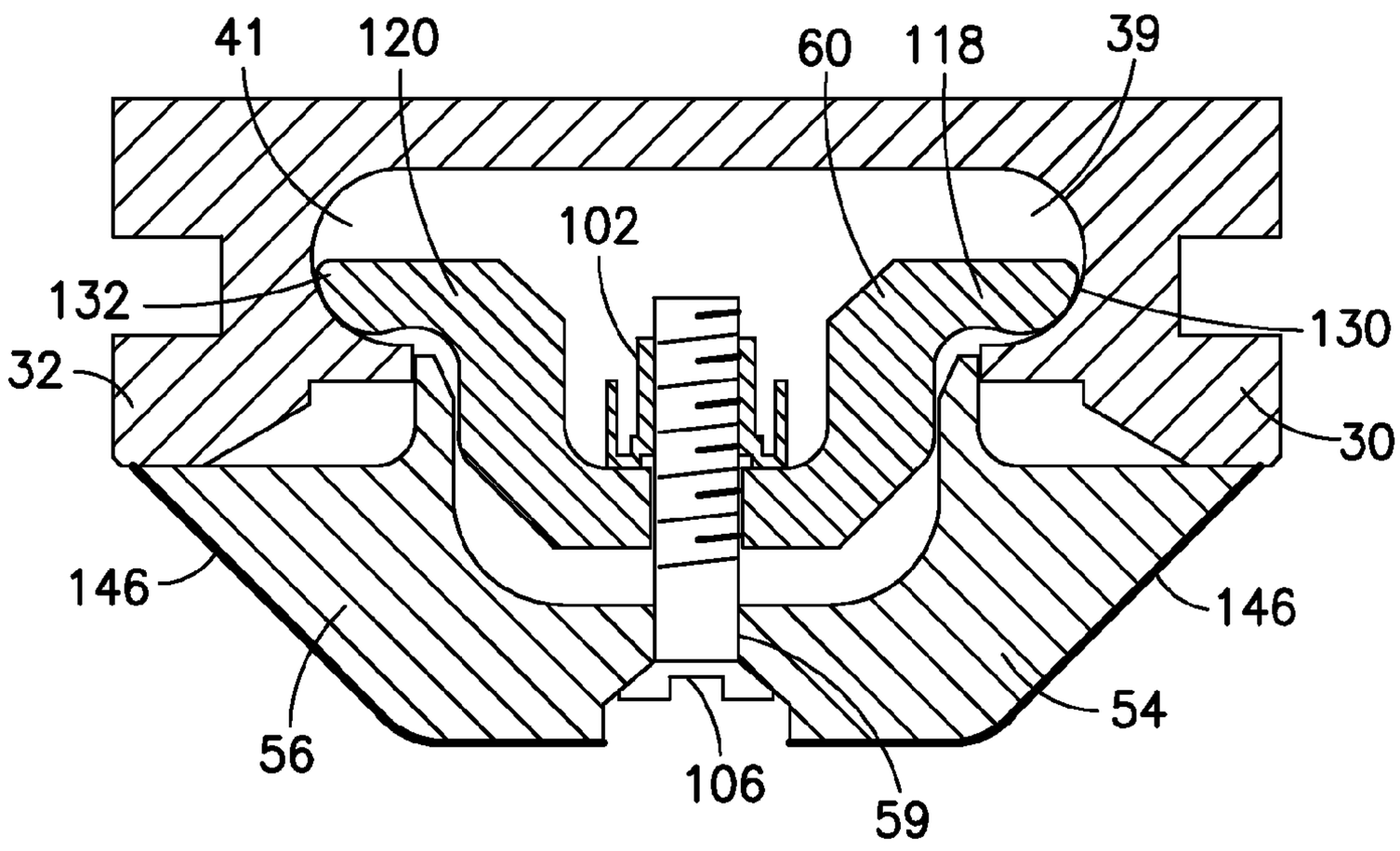
102
92
38
138

FIG.7A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106
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FIG.7B

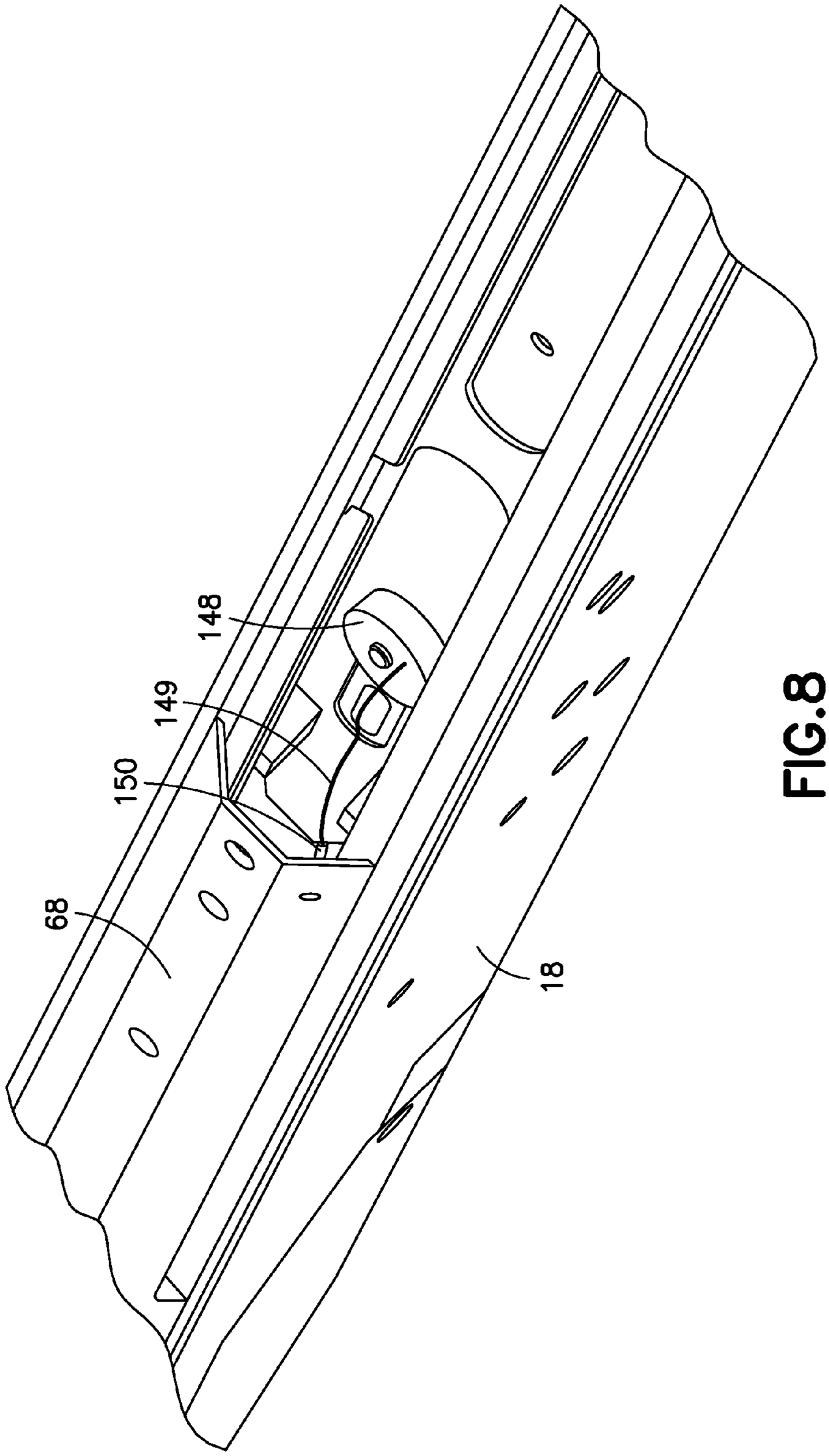
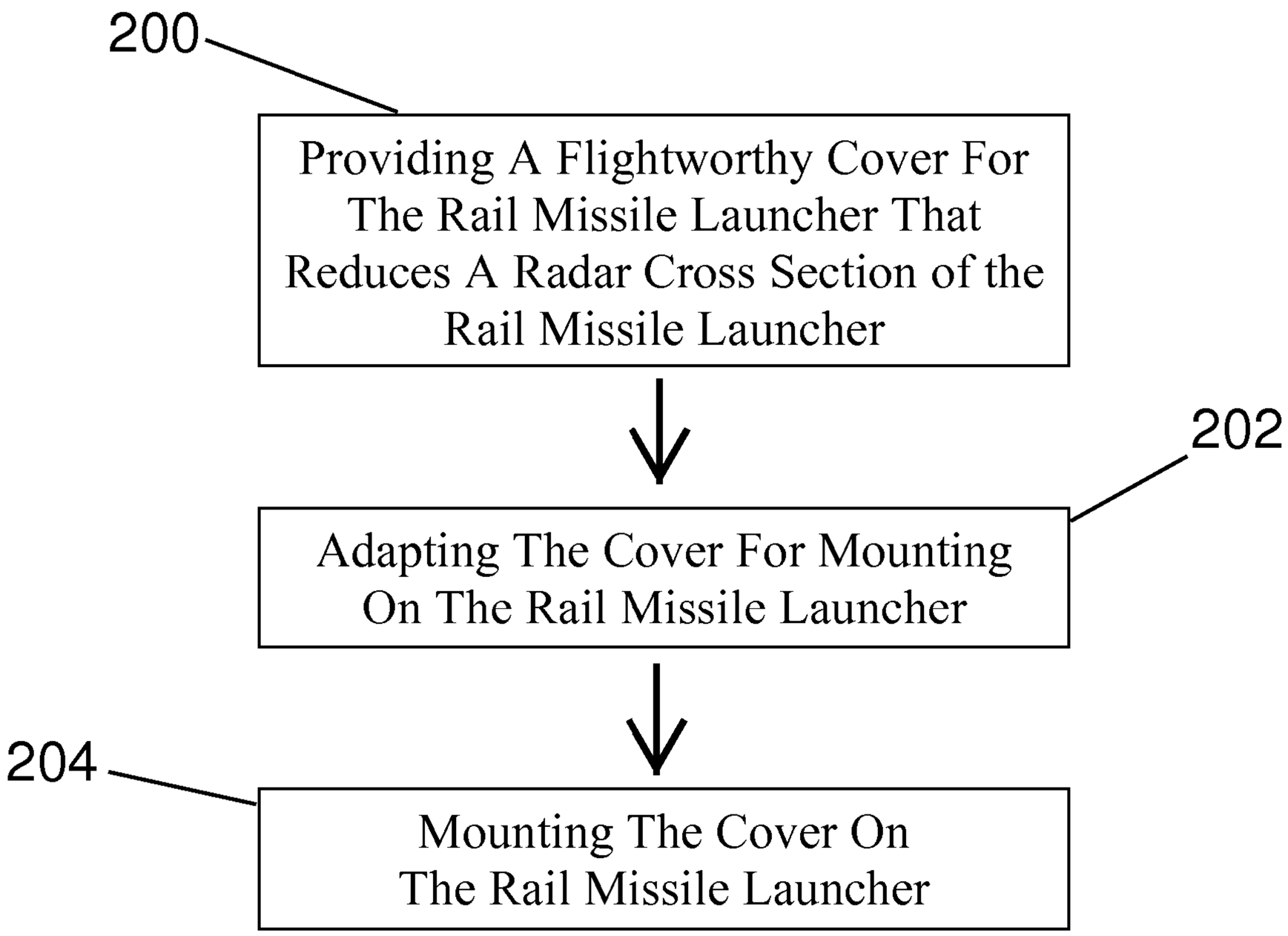


FIG.8

FIG. 9


200
Providing A Flightworthy Cover For The Rail Missile Launcher That Reduces A Radar Cross Section of the Rail Missile Launcher
202
Adapting The Cover For Mounting On The Rail Missile Launcher
204
Mounting The Cover On The Rail Missile Launcher

AIRCRAFT MISSILE LAUNCHER COVER

TECHNICAL FIELD

This disclosure generally relates to a cover for an aircraft missile launcher and, more particularly, to a flightworthy cover for an empty rail missile launcher that reduces the radar cross section of the aircraft.

BACKGROUND

Air-to-air and air-to-ground missiles are typically mounted on missile launchers that are affixed to hard points on the fuselage or wings of an aircraft. Missile launchers fall into two categories, ejection type missile launchers such as the LAU-142 manufactured by the EDO Corporation and rail missile launchers such as the LAU-127 manufactured by the Marvin Group.

A rail missile launcher or "rail launcher" generally has attachment points on top for affixing the rail launcher to the aircraft and launch rails on the bottom for mounting the missile. Launch rails have guide slots or tracks that run longitudinally along the length of the launch rails. A missile is typically loaded on a rail launcher by slidably engaging the tracks with corresponding rails, hooks, or hangers located on the missile and then sliding the missile onto the launch rails. For example, the AIM-9 series of Sidewinder missiles is loaded onto LAU-127 rail launchers by engaging "T-hangers" on the Sidewinder with tracks on the LAU-127. When the missile is launched, the missile slides forward along the tracks until it flies clear of the aircraft towards the target.

In order to prevent the missile from inadvertently sliding off the rail launcher during flight, take-off, and landing, rail launchers typically have restraint mechanisms such as stops or detents that engage corresponding stops on the missile to prevent the missile from sliding off. The detents are lowered or retracted out of the way when the missile is being loaded, unloaded, or launched from the rail launcher. Rail launchers may also have grounding mechanisms for dissipating precipitation static or P-static. P-static is created when rain, snow, hail, dust, or other particles strike the surfaces of the aircraft. If not dissipated, P-static can damage the aircraft and its electronics.

Some missions do not require an aircraft to carry missiles. During such missions the rail launchers may be empty. Empty rail launchers typically have a large flat area, sharp angles, and cavities that reflect radar signals back to the radar transmitter. This increases the radar cross section of the aircraft, making it more detectible by radar. Rail launchers may be removed when a particular mission requires an aircraft to be less detectible by radar but does not require missiles. However, some aircraft are not allowed to fly without rail launchers attached. For example, the F/A-18 Hornet fighter jet is not allowed to fly without rail launchers attached to its wingtips even if a particular mission does not require missiles. Also, current procedures for removing and re-installing rail launchers are complicated, labor intensive and time-consuming. Moreover, rail launchers can be damaged during the process of removal and re-installation.

It is known in the art that an object can be made less detectible by radar to provide "stealth" capabilities by shaping the object's surface so that radar signals striking the object are reflected away from the radar transmitter. This lowers or reduces the object's radar cross section and therefore, its detectibility by radar. One way this is done is by eliminating or reducing the number of large flat areas, cavities, and sharp angles that reflect radar signals back to the radar transmitter.

This technique was used in the Lockheed Martin F-117 Nighthawk jet fighter. Unlike the large flat panels found in regular aircraft, the fuselage and wings of the F-117 Nighthawk consisted of numerous small flat panels called "facets" that were angled to deflect radar signals striking the aircraft away from the radar transmitter. Radar cross section can also be reduced by smoothing the surfaces, as long as such smoothing does not create reflections towards the radar transmitter.

Another method known in the art for reducing the radar detectibility of an object is the use of radar absorbent material or "RAM" in the manufacture of the object or to cover the object. Examples of radar absorbent materials include but are not limited to carbon, carbon fiber composites, or magnetic ferrite-based substances. Use of RAM reduces the amount of radar signals reflected back to the radar transmitter thereby reducing radar detectibility. Radar absorbent material was used by the F-117 Nighthawk, which was coated with a paint containing tiny iron balls ("iron ball paint") that absorbed radar energy.

It can be seen from the foregoing that a need exists for a cover for an empty rail missile launcher that reduces radar detectibility, is flightworthy and easy to install and remove without causing any damage to the rail launcher. As used herein, the term "flightworthy" means that the cover meets standard requirements for allowing the cover to be used while airborne or in flight.

SUMMARY

The foregoing purposes, as well as others that will be apparent, are achieved generally by a flightworthy cover for a rail missile launcher that has a reduced radar cross section and a method that reduces the radar detectibility of an empty rail launcher by reflecting radar signals away from the radar transmitter and/or by absorbing the radar signals transmitted by the radar transmitter. The cover uses hangers for slidably mounting and attaching the cover onto the rail launcher. The cover is also provided with restraint and grounding mechanisms. In accordance with one method, a flightworthy cover having a reduced radar cross section is provided for the rail missile launcher. The cover is adapted for slidably mounting and attaching to the rail missile launcher using hangers. Other objects, features, and advantages of the present disclosure will be apparent when the detailed description is considered in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments will be hereinafter described with reference to drawings for the purpose of illustrating the foregoing and other aspects of the disclosure.

FIG. **1** is plan view of an aircraft with an empty rail launcher mounted on each wingtip.

FIG. **2** is a perspective view of the rail launcher and left wingtip of the aircraft of FIG. **1**.

FIG. **3** is a perspective view of a cover mounted on the rail launcher of FIG. **2**.

FIG. **4** is a perspective view of the inner or inboard side of the cover of FIG. **3**.

FIG. **5** is a perspective view of the outer or outboard side of the cover of FIG. **4**.

FIG. **6** is a perspective view of a cover hanger of the cover of FIG. **4**.

FIG. **7**A is a cross-sectional view of the cover and rail launcher of FIG. **3** taken along line **7**A-**7**A.

FIG. **7**B is a cross-sectional view of the cover and rail launcher of FIG. **3** taken along line **7**B-**7**B.

FIG. **8** is the perspective view of the hanger and cover of FIG. **3** with an aft section of the cover not yet mounted on the rail launcher.

FIG. **9** is a flow chart illustrating the steps of a method for reducing the detectibility of a rail missile launcher by radar;

DETAILED DESCRIPTION

Various embodiments will be hereinafter described with reference to drawings for the purpose of illustrating the foregoing and other aspects of the disclosure.

FIG. **1** depicts an aircraft **10** having a fuselage **12**, wings **14**, **16** and empty rail launchers **18** mounted on the tips **13** of each of the wings **14**, **16**. Alternatively, rail launchers **18** can be mounted below wings **14**, **16** or on fuselage **12**. As shown in FIG. **2**, rail launcher **18** includes a launcher forward end **20**, a launcher aft end **22**, a restraint detent **24**, and launch rails **26**, **28**. Launch rails **26**, **28** have rail forward ends **30**, **32**, rail aft ends **34**, **36**, and guide tracks **38**, **40** running longitudinally along the length of each launch rail **26**, **28**. There are also forward tracks **39**, **41** running along the length of rail forward ends **30**, **32**.

Referring to FIGS. **2**-**3**, a flightworthy cover **42** with reduced radar cross section is adapted to be slidably mounted and secured to launch rails **26**, **28** using a forward hanger **60** and cover hangers **62** (FIG. **4**) to provide rapid and efficient installation and removal of cover **42** from rail launcher **18**. As set forth below, cover **42** is shaped to reflect radar signals away from the radar transmitter and may be covered by a material that absorbs radar signals transmitted by the radar transmitter.

Referring to FIGS. **3**-**5**, cover **42** includes a cover forward end **44**, a cover aft end **46**, an outboard side **48**, an inboard side **50**, a center web **52**, an upper side **53**, a lower side **55**, and cover flanges **54**, **56**. Cover holes **58** (FIG. **3**) are spaced apart along the length of center web **52** and used for securing the cover **42** to the rail launcher **18**. As used herein, "inboard" means facing in the direction of aircraft **10** (FIG. **1**) while "outboard" means facing away from aircraft **10**. Cover **42** also has forward hanger **60** in forward end **44** on inboard side **50** adjacent to cover hole **59** (FIGS. **3**, **4**) in forward end **44** and cover hangers **62** disposed along the remaining length of inboard side **50** adjacent to cover holes **58**.

As shown in FIG. **4**, longitudinal stiffeners **64** run along the length of inboard side **50** while transverse stiffeners **66** run along the height of inboard side **50**. Transverse stiffeners **66** are disposed perpendicular to and across longitudinal stiffeners **64**. Stiffeners **64**, **66** strengthen cover **42** and allow it to be thinner and lighter while remaining strong.

Cover **42** (FIGS. **3**-**5**) is generally rectangular with parallel sides **53**, **55** and forward and aft ends **44**, **46** that taper to points **45**, **47**. Center web **52** is generally rectangular with a planar surface, parallel center web sides **49**, **51** and flanges **54**, **56** extending longitudinally outwards from center web sides **49**, **51**. Viewed from the front (FIG. **7**A), the cross-sectional shape of cover **42** resembles a triangle wherein flanges **54**, **56** form the legs of the triangle and center web **52** forms a flattened vertex oriented in an outboard direction. The flattened triangle shape reduces the area of flat surface exposed to radar signals and helps reflects radar signals away from the radar transmitter. In the present embodiment, flanges **54**, **56** are disposed at an acute angle of about **45** degrees below the planar surface of center web **52**. In other embodiments, depending on the anticipated reference plane of the radar transmitter, the cover flanges may be disposed at other acute angles. Alternatively, instead of a flattened triangle shape, the cross-section of the cover may be in the shape which matches the contours of the launcher or aligns with other features of the aircraft.

Referring to FIGS. **3**-**5**, cover **42** of the illustrated embodiment comprises a forward section **68** and an aft section **70** that are connected together at a splice joint **72**. In other embodiments the cover may consist of three or more sections connected at several splice joints or only a single unitary section. Forward section **68** has an aft edge **74** and a splice hole **76** located adjacent to splice joint **72**. Aft section **70** has a forward edge **78** and a flat rectangular splice tab (not shown) with a tab hole (not shown). The splice tab is located on inboard side **50** adjacent to forward edge **78**. The splice tab is disposed parallel to center web **52** and projects forward at a distance from forward edge **78** and across splice joint **72** so that the tab hole is located below and concentric with splice hole **76**. A splice fastener lock (not shown) such as a nut is affixed over the tab hole on the inboard side of the splice stab. Aft edge **74** overlaps the splice tab and is in face-to-face engagement or contact with forward edge **78**. A splice fastener **80** such as a screw, pin or bolt placed through splice hole **76** and the tab hole and into the splice fastener lock holds forward section **68** and aft section **70** together.

Cover hanger **62** (FIGS. **6**, **7**A) is generally shaped in the form of a rectangular block having a hanger outboard side **82**, edge sides **84**, **86**, side walls **88**, **90**, hanger flanges **92**, **94**, a cavity **98**, and a hanger hole **100**. Cover hanger **62** (FIG. **6**) also has a cutout or channel **96** to reduce the weight of hanger **62**. A hanger fastener lock **102** such as a nut is located inside cavity **98** and held in place with a cavity fastener **104** such as a rivet. Cover hanger **62** (FIG. **7**A) is connected to cover **42** by a hanger fastener **106** such as a bolt or screw placed through cover hole **58** and hanger hole **100** and into fastener lock **102**. Referring to FIGS. **2** and **7**A, flanges **92**, **94** are slidably engageable into tracks **38**, **40** enabling cover **42** to longitudinally slide along launch rails **26**, **28**. As discussed in more detail below, this allows cover **42** to be slidably installed and removed from rail launcher **18**. Tightening together fasteners **106** and fastener locks **102** moves hangers **62** and cover **42** towards each other like a vise, thereby clamping cover **42** to rail launcher **18**.

Forward hanger **60** (FIG. **7**B) is generally similar in shape to cover hanger **62** and also has flanges **118**, **120**. However, forward hanger **60** differs from cover hanger **62** in that distal ends **130**, **132** of flanges **118**, **120** are rounded. In contrast (FIG. **7**A), distal ends **138**, **140** of flanges **92**, **94** cover hanger **62** are square-shaped. As explained below, in the present embodiment, cover **42** is adapted for mounting on an LAU-127 rail launcher. The LAU-127 rail launcher has curved track outlines in forward tracks **39**, **41** of rail forward ends **30**, **32**. The rounded-shape of the distal ends **130**, **132** (FIG. **7**B) allows forward hanger **60** to conform to the curved outline of forward tracks **39**,**41** in rail forward ends **30**, **32** of the LAU-127 rail launcher **18**. Other than this difference in shape of distal ends **130**, **132**, forward hanger **60** is otherwise identical to cover hanger **62**, is connected to cover **42** with a fastener **106** and lock **102** in the same way as cover hanger **62**, and operates in the same manner as cover hanger **62**.

Referring the FIG. **7**A, fastener **106** and lock **102** securely connects cover hanger **62** to cover **42** but can be easily loosened to allow hanger **62** and cover **42** to be spread apart so that flanges **92**, **94** can be slidably inserted into tracks **38**, **40**. This enables cover **42** to be slidably mounted on launch rails **26**, **28**. The simple clamping procedure whereby fastener **106** and lock **102** are tightened to clamp and secure cover **42** to rail launcher **18** minimizes damage to rail launcher **18** and elimi-

nates any need to modify rail launcher **18** to allow cover **42** to be secured thereon. Also, the use of a simple fastener **106** and lock **102** arrangement obviates the need for special tools to mount or remove cover **42** from rail launcher **18**. In addition, since fastener **106** and lock **102** only have to be loosened in order to mount or remove cover **42** from rail launcher **18**, the mounting and removal process is easier and faster since there is no need to attach or re-attach cover hangers **62** to cover **42** every time cover **42** is mounted or removed from rail launcher **18**. Further, using only a single fastener **106** to connect each cover hanger **62** to cover **42** reduces weight.

As discussed in more detail below, cover **42** is attached to rail launcher **18** by slidably mounting cover **42** on launch rails **26**, **28**. Referring to FIG. **7**A, this procedure is enabled by flanges **92**, **94** which are adapted to slidably engage tracks **38**, **40** in the same manner as the hangers of a missile. Thus, rail launcher **18** does not have to be modified to allow cover **42** to be slidably mounted thereon. In addition, the slideable mounting procedure for attaching cover **42** to rail launcher **18** is similar to the slideable mounting procedure used by ground crews to load and unload a missile from rail launcher **18**. Thus, it is easier to train ground crew to mount and remove cover **42** from rail launcher **18**.

Referring to FIGS. **4**-**7**B, the illustrated embodiment of cover **42** weights about 10 pounds and is about 108 inches long. Forward section **68** is about 35.01 inches long and about 3.61 inches wide while aft section **70** is about 73.71 inches long and about 2.93 inches wide. Center web **52** is about 0.12 inches thick while cover flanges **54**, **56** are about 0.10 inches thick. Longitudinal and transverse stiffeners **64**, **66** are between about 0.08 to about 0.12 inches thick. Referring to FIGS. **6** and **7**A, cover hanger **62** is about 2 inches long and about 2.25 inches wide. Hanger **62** is about 0.84 inches thick measured from outboard side **82** to the bottom of channel **96**. Flanges **92**, **94** are about 0.20 inches thick and about 0.25 inches wide. As explained below, the foregoing dimensions enable mounting of cover **42** to an LAU-127 rail launcher. However, the foregoing dimensions can be adjusted to accommodate mounting cover **42** on other rail launchers models. In the illustrated embodiment, cover **42** and hangers **60**, **62** are machined from 7075-T7351 aluminum bar stock. In other embodiments, the cover and hangers can be made from other materials such as steel, titanium, composites, and plastics. Instead of machining, the cover and hangers can be made by made by welding, casting, 3-D printing, extrusion, and sintered powdered metal. In the present embodiment, fasteners **80**, **106** are 3M1169C4 Inconel 718 fasteners while the splice fastener lock (not shown) and locks **102** are ST3M719 self-locking plate nuts. In other embodiments, the fasteners can be MS or NAS standard fasteners.

The particular shape, dimensions, composition, weight, and method of manufacture of the cover and hangers, as well as the particular kind of fasteners and holders used, depend on several factors. These factors include the model or manufacturer of the rail launcher, frequency of the radar signals, weight restrictions, cost, maintenance requirements, aircraft to which the cover and rail launcher will be mounted, military specifications, operational environment, and flight certification requirements among others. In the illustrated embodiment (FIGS. **3**-**7**B), the shape, dimensions, composition, weight and method of manufacture of cover **42** and hangers **60**, **62** enable cover **42** to meet the requirements necessary for mounting cover **42** on an LAU-127 rail launcher that is attached to the wingtips of the F/A-18 Super Hornet fighter jet.

Referring to FIGS. **7**A-**7**B, cover **42** may be coated with a layer of radar absorbent material **146** on outboard side **48**, which may be spray-applied to the outboard side **48**. The particular type of radar absorbent material used depends on factors such as frequency of the radar, maintenance requirements, cost, weight restrictions, corrosion, military specifications, operational environment and flight requirements. Examples of radar absorbing material are "iron ball" paint, neoprene polymer sheets or tiles embedded with ferrite grains or conductive carbon black particles. The particular method of applying radar absorbing material to cover **42** depends on the kind of radar absorbing material used as well as the same factors affecting the choice of radar absorbing material.

Cover **42** is also provided with a grounding mechanism for dissipating "P-static". Referring to FIG. **8**, the grounding mechanism consists of a grounding element **148** that is connected to rail launcher **18** and a cover terminal **150** connected to cover **42**. A wire **149** connecting grounding element **148** to cover terminal **150** conducts static electricity from the cover to the launcher where it is dissipated. In the illustrated embodiment, grounding element **148** is a grounding disk made of a woven cotton fabric substrate impregnated and bonded with phenolic resin matrix that plugs into a receptacle (not shown) in rail launcher **18**. In the present embodiment, the receptacle is the electrical interface connector between the aircraft and an AIM-120 missile while cover terminal **150** is a fastener such as a screw or bolt connected to forward section **68**. In other embodiments, the grounding mechanism may consist of wire or a strap connected to the rail missile launcher.

Cover **42** is also provided with a restraint mechanism for preventing cover **42** from inadvertently sliding off rail launcher **18** during flight, take-off, and landing. Referring to FIGS. **2** and **4**, the restraint mechanism consists of a pair of parallel restraint tabs **156** located on inboard side **50** of aft section **70**. Restraint tabs **156** are adapted to engage restraint detent **24** between tabs **156** and prevent longitudinal movement of cover **42** along rail launcher **18**.

Referring to FIGS. **2**-**5** and **7**A-**7**B, in order to mount cover **42** to rail launcher **18**, restraint detent **24** is lowered and fasteners **106** loosened sufficiently to allow hangers **60**, **62** to fit into tracks **39**, **41** and **38**, **40** respectively. Aft edge **74** of forward section **68** is placed adjacent to forward end **20** of rail launcher **18** and moved rearward until flanges **92**, **94** enter tracks **38**, **40**. Forward section **68** is then slid rearwards along track **38**, **48** until flanges **118**, **120** enter tracks **39**, **41** and cover forward end **44** reaches rail forward end **30**, **32**. Grounding element **148** is plugged into the receptacle of rail launcher **18**. Forward edge **78** of aft section **70** is then placed adjacent to aft end **22** of rail launcher **18** and moved forward until flanges **92**, **94** enter tracks **38**, **40**. Aft section **70** is moved forward until forward edge **78** contacts aft edge **74** and splice hole **76** is aligned with the tab hole. Splice fastener **80** is placed through splice hole **76** and the tab hole and into the splice fastener lock and tightened. Fasteners **106** are tightened and restraint detent **24** raised to secure the cover to the rail launcher. In order to remove cover **42** from rail launcher **18**, the foregoing procedure is done in reverse order.

FIG. **9** illustrates a method for reducing the detectibility of a rail missile launcher by radar. The first step **200** consists of providing a flightworthy cover for the rail missile launcher that reduces a radar cross section of the rail missile launcher. In the second step **202**, the cover is adapted for mounting on the rail launcher. Finally, in step **204** the cover is mounted on the rail launcher as previously described. In one embodiment, providing a cover **200** with reduced radar cross section comprises shaping the cover to reflect radar signals away from a

radar transmitter. Providing a cover **200** may also include covering an outer surface of the cover with radar absorbent material.

While the invention has been described with reference to certain exemplary embodiments, such embodiments are for purposes of illustration and not limitation. It will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation to the teachings herein without departing from the essential scope thereof Therefore it is intended that the claims not be limited to the particular embodiments disclosed. The method claims set forth hereinafter should not be construed to require that the steps recited therein be performed in alphabetical order or in the order in which they are recited, and should not be construed to exclude two or more steps being performed contemporaneously during at least a portion of the duration of one of said steps.

The invention claimed is:

1. A cover for a rail missile launcher having a launch rail comprising: a flightworthy cover adapted for reducing a radar cross section of the missile launcher and a hanger for slidably mounting the cover on the launch rail.

2. The cover of claim **1**, wherein the cover is shaped to reflect a radar signal transmitted by a radar transmitter away from the radar transmitter.

3. The cover of claim **1**, wherein the cover is adapted to absorb a radar signal transmitted by a radar transmitter.

4. The cover of claim **3**, wherein an outer surface of the cover comprises a radar absorbent material.

5. The cover of claim **3**, wherein the cover comprises a radar absorbent material.

6. The cover of claim **1**, wherein the launch rail has a guide track and the hanger is adapted to slidably engage the guide track.

7. The cover of claim **1**, wherein the cover comprises:

a forward section;

an aft section; and

a splice joint connecting the forward section to the aft section.

8. The cover of claim **1**, further comprising:

a grounding mechanism for dissipating precipitation static, the grounding mechanism comprising:

a grounding element connected to the launcher;

a cover terminal connected to the cover; and

a wire connecting the cover terminal to the grounding element.

9. The cover of claim **1**, wherein the rail launcher includes a restraint detent, the cover further comprising: a restraint mechanism for engaging the restraint detent.

10. A method for reducing detectability of a rail missile launcher by radar comprising:

providing a flightworthy cover for the rail missile launcher that reduces radar cross section of the rail missile launcher; and

providing a hanger for slidably mounting the cover to a launch rail of the rail missile launcher.

11. The method of claim **10**, further comprising: applying a layer of radar absorbent material on an outer surface of the cover.

12. The method of claim **10**, further comprising: providing a grounding mechanism for dissipating precipitation static.

13. The method of claim **10**, further comprising: providing a restraint mechanism for preventing the cover from sliding off the cover.

14. A cover for a rail missile launcher, the cover comprising:

a flightworthy cover adapted for reducing a radar cross section of the rail missile launcher, comprising;

a forward section;

an aft section; and

a splice joint connecting the forward section to the aft section;

a plurality of hangers adapted for slidably mounting the cover on a launch rail of the rail missile launcher;

a grounding mechanism; and

a restraint mechanism.

15. The cover of claim **14**, further comprising a layer of radar absorbent material covering an outer surface of the cover.

16. The cover of claim **14**, wherein the forward section and the aft section is composed of a radar absorbent material.

17. The cover of claim **14**, wherein the cover has an outboard side, the outboard side comprising:

a rectangular center web having a planar surface and parallel sides; and

a flange extending outward along a length of each side at an acute angle below the planar surface.

18. The cover of claim **14**, wherein the hanger comprises:

a flange adapted for slidably engaging a track of the launch rail; and

a fastener for attaching the hanger to the cover.

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